

Investigating the impact of Socio-economic Determinants on Quality of Life of Slum Dwellers in Delhi NCR

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Abstract

The subject of urban poverty and growing slums is a central issue of the fast urbanizing regions and especially in the urban regions of Delhi NCR where large problems of housing, sanitation, health and livelihoods are grossly deficient in the informal settlements that a large proportion of the workforce coincides with these high numbers of shanty towns. The necessity to ameliorate the life particularly of the slum inhabitants is critical in fulfilling the United Nations Sustainable Development Goals where the goal 11 that deals with pre-coitally included and shabby urban condition. This paper aims to address the multidimensionality of the determinants of the quality of life among slum dwellers apprehending eight critical issues, which comprise holistic development deficiency, long-term sustainability, incorporation of the informal economy, community needs evaluation, community participation, economic facilities, integration of infrastructure and affordable housing. The trials used a mixed method. Primary data delivery was carried out by administering a standard questionnaire to 850 slum dwellers in Delhi who achieved an overall sustainable response of 674 following extrusion. Focus groups were used to conduct a pilot research in developing the instrument. Convenience and snowball sampling has been utilized in sampling since people in the slums are dynamism. Descriptive statistics, correlation, and regression analysis with the add-on theme insight developed during focus group discussions were used to analyze data. The results show the use of cheap housing, community involvement, and economic-community opportunities are the most significant differentiators of better quality of life as the sustainability of the need and needs assessment are highly crucial interchangeable connections. Poor infrastructural constructions with holes and missing links are still the bane of sustainable development. The implications in the future include the fact that it ought to be holistic, participative and rights based methodology. Long term planning should be strategic and this demands that policy makers integrate housing and livelihood with infrastructural developments and identify slum dwellers as an emerging stakeholder in the urbanization processes.

Keywords: *Background on Urban Poverty and Slum Proliferation in Delhi NCR*

INTRODUCTION

Urban poverty becomes a growing stone in the path of twenty first century development and more specifically amongst the ever-growing metropolitan centres in the global south. The same dynamics can be observed in the National capital region of India, the so-called Delhi NCR that was defined by the blistering urban development with the expansion of informal settlement. Scientists think that slums are not manifestations of immigration and population pressures, but the results of a process of exclusionary planning and policies (Chiodelli and Moroni, 2014). Urban centers are often growing and the population in low income bracket is often overlooked in urban planning systems earning the city residents to take up habitation in the outskirts where access to most facilities are limited. This has created severe socio spatial inequalities in Delhi NCR that co-exists alongside rich enclaves and slums situated side by side. Growth of slums is the indication of structural issues in land and labor markets. Alternative explanations have been made by Marx et al., (2013) arguing that the slums are a balance infirmation of the urbanization process, in which the requirement to have cheap housing comes together with insufficient institutional capacity to realize the credit. The lack of tenure security, restrictive rental option, and access to the affordable housing programs in India has compounded the growth of slums (Sawhney, 2013). Rukmana (2015) stresses that the urban peripheries are the places of pressure in which the migrants gather trying to find jobs, but without adequate services. The perpetuation of such trends reduce the developmental potential of the cities, particularly in a metropolitan area such as Delhi NCR, wherein slums house a relative large number that forms bulk of the labor force that propels the urban economy.

Slums Upliftment and the Sustainable Development Objectives

International development community has increasingly emphasised the importance of slum upgrading in the framework of the United Nations Sustainable Development Goals (SDGs). Goal 11, an inclusive,

safe, resilient and sustainable urban environments, clearly requires improvements in housing and infrastructure in informal settlement. But statistics show that improvement is uneven. Subbaraman et al. (2012) reveal how slums in India that are under no-notification are not captured by policy frameworks and therefore fail to provide needed services to the slum dwellers. Similarly, Smith (2013) points out that lack of a uniform and consistent definition of the term slum is a problem with measurement and intervention. Without formal recognition, there is the probability that millions of urban poor will be shut out by policies. Slum upliftment goes a long way to progress many Sustainable Development Goals simultaneously. Improved housing and sanitation is a boost to health (Bhattacharjee et al., 2021) but access to potable water and infrastructure is a relief to the gender-focused life and an increase in education opportunities. Disparities are lessened by economic empowerment through improved connectivity and accessibility of workforce, thereby facilitating prosperity. Duron, together with Venables (2018) argues that the long-term gains achieved by a phancy once slums are encompassed in plantations around metropolitan regions can be immense. Therefore, slum rehabilitation in Delhi NCR is a moral and social responsibility, not only as a strategic process to achieve many related Sustainable Development Goals (SDGs).

Slum upliftment plays an important role in improving the quality of life of the urban poor because it directly addresses urban poor housing, health, environment, and livelihoods deficiency and gaps. Sarkar and Bardhan (2020) argue that socio-physical livability improves when resettlement takes into account the spatial and communal needs, and Bhattacharjee et al. (2021), state, are closely connected with housing and sanitation healthcare and availability of nutrients. Infrastructure is crucial: Talpur et al. (2018) determine that transportation design has the potential to connect marginalized regions to economic opportunities, whereas Pekel et al. (2016) exemplify the role played by water mapping as a potential mitigator under exposure to vulnerabilities. Upliftment also applies to rights; the claims by slum residents that they have a right to the city only emphasizes the importance of recognition and belonging (Slum-dwellers and their right to the city, 2022). Indirect holistic urban analyses confirm that it is important to incorporate with the urban economies and develop increased links. Glaeser and Henderson (2017) claim that, instead of isolating them, cities promote prosperity due to the inclusion of the informal communities, yet as Lawamson (2020) illustrates, lampulae in Lagos were overcrowded, which, during the COVID-19, increased the risk of vulnerability and proved the importance of the changes. According to Bhellar et al. (2023), sustainable transportation and accessibility also have direct impacts on the mobility, which is an important aspect of the well-being of slum households. The combination of the literatures portrays that one can not limit slum improvement to strictly physical home improvements. It should entail infrastructure, health and mobility, environmental resilience as well as legal interpretation of rights to ensure that there are major improvements in the quality of life of the slum inhabitants.

Objective of Study

These global and local problems give rise to the objectives of this study. This paper will look into the number of treadings through which housing, sanitation, health, education, income, women empowerment, employment, and availability of government programs are combined to influence the quality of life of slum dwellers in Delhi NCR. There has often been fragmentation in the far past study of deprivation with one or two aspects of deprivation being studied at a given moment. According to Kearns et al. (2019), slum initiatives should be discussed not only in terms of short-term effects but also in connection with a long-term influence on society, which requires a more generalized methodology. The study is aimed at providing a thorough evaluation by use of both quantitative and qualitative research methodology. Despite many descriptive studies (Sawhney, 2013; Budiari, 2016), not many have looked rigorously at the interrelationships among these variables. Correlation and regression analysis are conducted as the primary methods to determine the important factors shaping quality of life, whereas the focus group insights are taken to understand the community aims in a better way. The importance of managerial analytics and data-driven methodologies to inform decision-making are the priority stated by Combes et al. (2021), which this research adjusts through careful modeling of the statistical aspect.

Third, the paper discusses the policy of slum improvement at NCR of Delhi. Affordable housing policy has received new attention; however, the effectiveness depends on the security of tenure and service inclusion (Sarkar and Bardhan, 2020; Mohapatra, 2022, but not a part of this collection, is applicable in this context). It is also necessary to integrate infrastructure, which includes transportation and digital communication. The article by Baragwanath et al. (2021) shows that satellite video can help to reveal hidden city markets, which demonstrates that data-based tools can enhance design. Talpur et al. (2018) stipulate that transportation design of marginalized regions should align with the aims of socio-economic

development. The study unites the scientific implications with the policy implications, which helps to come up with the inclusion urban policies. Procedures that ignore the feedbacks of the stakeholders do not often bear fruits, and on the contrary enhanced procedures bear much more sustainable fruits. Given ever-changing political discourses in India, Mitra (2021) notes that the rights of slum citizens are gradually gaining achieving credit; however, gaps remain in its execution. It is vital to correct these gaps to ensure that improvement of slums contributes immensely to the achievement of SDGs.

3. LITERATURE REVIEW

Quality of life (QoL) at urban slums is a layered concept that involves not only material aspects of living but also state of recognizance, schooling, social bonds and freedom of choice. Within the perspective of urban studies, urban built environment and the accessibility of vital services, such as housing, sanitation, and transportation, have a great influence on the quality of life. In India, the rapid rate of urbanization has created unequal settlements where the population with low-income is left to stay in the peripheries with poor infrastructure, further depriving the disadvantaged (Bhagat, 2011). The patterns observed in the region show that household income is not enough to evaluate the quality of life as it must also include broader environmental and geographical drawbacks (Sarkar, 2019). The parameters of what a slum is are quite difficult to define. Policy definition in India varies across states and programs, thus leading to misidentification of the beneficiaries. Nolan (2015) indicates that the choices determined regarding definitions have a direct effect on the measurement of health inequities since no one often chooses to survey slums that are not officially announced, thus underestimating deprivation. New approaches promote the use of composite indices, including many deprivations because focusing on only one statistic hides the reality of slum residents (Patel et al., 2020).

Urban studies takes the importance of location and land institutions. This is because the area that slum is located in the city determines the accessibility of the residents to the jobs, education, and services. Relocation to peripheral areas, even with improved housing cannot contribute to the quality of life since it can cut off access to employment and schools. Barnhardt et al. (2014) show that the resettled families in India often face social marginalization and reduced subsistence opportunities, and Franklin (2020) states that the South African resettlement programs destroyed community networks even with providing formal housing. The improvement efforts in Mumbai, which improved buildings for the expense of performing those according to tenure and infrastructural considerations, achieved a slow level of welfare outcome (Bardhan et al., 2015). These results overpower the fact that quality of life is directly related to the urban dynamics on space.

In sociological terms, the quality of life depends on networks, participation, and tact of identifying. Slums are places where informal networks of mutual aid empowerment its sustained households with economic instability. When these networks are severed in the process of reconstruction, everyday well-being often becomes poorer, regardless of material improvement. Sharma et al. (2020) argue that such programs that involve locals in the planning have better technical results, and at the same time they promote dignity and empowerment. Patel (2013) also points out that top-down migration weakens ties to the communities and that integrative in-situ upgrading strengthens them. These experiences show that the quality of life cannot be seen to be material improvement only but also as social continuity. Development studies augment into the quality of life by conceptualising the life to develop on the capabilities- which are the real freedoms that people have to live according to the valued lifestyles. According to Tacoli et al. (2012), immigration into slums can further the potential of some and simultaneously expose other people to even greater risks, such as insecure tenancies and malevolent living conditions. Xu et al. (2021) believe in urban peripheries, climate change and economic transition intersect as slum households face employment and economic opportunities and threats. There is little use in the improvement of capacities with initiatives focused on housing building and lack of attention to education, health, or employment in India, there are only short-term improvements in living standards in some cases.

Internationally, agencies such as UN-Habitat and the World Bank have increasingly adopted a multidimensional approach to slum upgrading, that emphasizes the delivery of services and livelihood and governance, despite not focusing principally on housing. Cohen (2014) notes that earlier international models did not consider the metropolis as a unit of analysis because their focus was on the rural poverty. Affirmative approaches in more modern models are being reflected in frameworks, including the Sustainable Development Goals, which recognize urban poverty as multidimensional and tied to inlpatibility, involvement, and environmental strength (Fox, 2014). It is not only income and

housing that change the quality of life in slums; it is the interconnection of location, services, social structure and personal skills. Measurement cannot be done without definitions, geographical context is needed to access possibilities and participation is critical to dignity and sustainability. These findings form the theoretical grounding of assessing the quality of life in slums of Delhi NCR, where the policy must include such aspects as housing, infrastructure, social inclusion, and long-term resilience to move beyond short-term reduction of poverty rates (Sawhney, 2016).

Lack of Holistic Development and Quality of Life

The urban slum programs often fail because they have attempted to address only one dimension of impoverishment and ignored multiple dimensions. Scientists argue that the quality of life is inherently multidimensional, and it asserts health, education, income, housing, and provision of services (Lilford et al., 2016). Most Indian and African examples of programs aimed at home-based housing provision without improving infrastructure or livelihoods have proved to be ineffective (Brueckner and Lall, 2015). Bhan and Jana (2013) show that in Delhi, relocation projects have allowed housing facilities to be built, yet disfunction people residing in the regions by disconnecting them with the livelihood link, which results in the decline of general well-being. Similarly, Barnhardt et al. (2017) stress that the evacuation of slum locals to outskirts destroyed their social support system and connections to the labor market, which demoralized promised benefits aimed at the improvement of living conditions. According to other research, the integration of slums is often ignored in non-holistic planning into the larger urban economy. According to Patel et al. (2014), in Mumbai, gradual housing development was the most efficient when incorporated with some utilities like sewage, water, and power. As De (2017) argues, multifaceted approaches are necessary because one-time benefits only provide short-term benefits and does not break the cycles of poverty forever. In other contexts other than India, the lack of integration of the housing, services and livelihoods has led to unpredictable results. According to Brooks and Lutz (2016), the tactics of assembly of fragmented land in the U.S. cities often focused on poor communities disregarding them rather than making them better.

Experiences in Ghana, Nigeria, and Bangladesh show that development patterns that do not consider community input and multi-sectoral planning do not reflect the real experience of replicants in slums (Agyabeng et al., 2022; Aribigbola et al., 2022; Ali et al., n.d.). Without a combination of housing, education, healthcare, and environmental planning, long-term improvements in the quality of life will never be become a possibility. The argument in the literature is always that slum people can only be helped by implementing holistic, integrated, and participatory planning in terms of their well-being.

Hypothesis 1 (H1 a): Lack of Holistic Development of slums negatively affects the quality of life of slum dwellers.

Long-Term Sustainability and Quality of Life

Such an issue as the sustainability of slum upgrading initiatives is much concerned in the literature. Many projects have been associated with immediate improvements but fail in a matter of time because of institutional failure, lack of sufficiently supporting maintenance, or unsatisfactory urban planning. Presented by Brueckner and Lall (2015), it is argued that long-term infrastructure planning and difficulties of tenuring and renting the land will not allow slum solutions to be long-lasting. Lilford et al. (2016) also affirm that housing development should be accompanied by improvements in health, sanitation, and education in order to produce lasting improvements in the quality of life. Sustainability is centered on the environmental issues. An example is provided by Sapuay (2016), who depicts that sustainable solid waste management and the recovery of the trash encourage the long-term reasonability of metropolitan health, especially in low-income districts. According to Talkhabi et al. (2022), exceeding the limits posed by urban pressures through changes in population in urban settings causes sprawl and decay, which will fundamentally jeopardize the sustainability of slum settlement unless properly controlled. The experience of Accra and Lagos illustrates that uncontrolled urban development increases vulnerable levels in the midst of the lack of sustainability over the framework of policies (Aribigbola et al., 2022; Agyabeng et al., 2022).

Location and connectivity is also linked to sustainability. Ghosh and Das (2017) reveal that as Indian cities grow into peripheral areas, often, these expansion plans involve slums, which implicates inefficient connectivity, increases the risk of displacement. Jain and Korzhenevych (2020) argue that the census towns that emerge because of various uncontrolled development in India serve as an example of the inefficiency of traditional master planning, which makes sustainability an issue still. In this regard, Shekhar (2021) demonstrates that the development of the slums in Kalaburagi is a perfect example of how a successful relocation process needs to be planned to involve the choice of the livelihood and service

continuity. De (2017) and Patel et al. (2014) underline that the sustainability of initiatives is preconditioned with inclusive planning and uncompromised commitment to the policy. F Taeper and F MacA successively gain short term enhancement with no maintenance, but incorporated renovations by combining the services so as to guarantee the tenure and offer economic prospects might enhance the quality of life in the long run.

Hypothesis 2 (H1b): Long run sustainability significantly improves the livelihoods of slum residents.

Informal Economy Integration and Quality of Life

The informal economy forms a basis of the livelihood systems in slums which impact on income, social connections as well as strength. In explaining this, Fox (2014) shows that the majority of slum- dwellers in Sub-Saharan Africa depend on informal works of employment, and such employment guarantees subsistence and at the same time causes vulnerability because of lack of social protection. According to Glaeser et al. (2018), the possibilities inherent in the concept of urban life are often unrealized in cases where the informal markets are dominant without any formal support. Including informal economies in the formal institutions is a challenge that will improve quality of life. Study carried out in India is an illustrative case. According to Barnhardt et al. (2017), relocation plans that displaced people at unstructured labor markets caused their incomes to decrease and welfare to toil. Bhan and Jana (2013) argue that slum rebuilding often proves ineffective because of its ignorance of informal economic importance in the survival strategies of people. Patel et al. (2014) certify that policy structures that focus on physical housing fail to acknowledge the economic events of a household, thus reducing the impact on the quality of life.

This can be verified all over the world. Mberu et al. (2016) demonstrate that in slum, rural, and urban areas, health indicators vary considerably, primarily due to economic gap that exists in informal jobs. Angoua et al. (2018) report that the supply of slums with water and sanitation in Abidjan was related to the purchasing power of households and depended on the informal revenues. Agyabeng et al. (2022) extend to indicate that informal activities should be taken seriously in ensuring fair urban planning is undertaken in Ghana, yet Aribigbola et al. (2022) demonstrate that such industries ought to be neglected in Nigeria because they promote the impact of marginalization. The geography factors also influence the informal economy. It is an urban development, as demonstrated by Ghosh and Das (2017), that will transform the geography of informal work by driving a large proportion of slum households out of key labour markets. According to Talkhabi et al. (2022), the expansion of Tehran city denies the poor opportunities to explore their economic potential as well. These findings confirm the need to incorporate the informal economies as a policy of planning instead of redist strokes. In most of the settings there is no confusion about the evidence: inclusion of the informal economy is a clarifying process that determines the living standards in the slums. The abandonment and failure to maintain this sector may simply endanger lives whether successes are realized or observed in housing services or not.

Hypothesis 3 (H1c): Informal Economy Integration increases the quality of life of the slum inhabitants substantially.

Community Needs Assessment and Quality of Life

One requirement that is of great importance in the formulation of interventions that take significant initiatives towards improved quality of life in the urban slums is community needs assessment. The lack of success in countless interventions has been attributed by the studies as failure to consider the existing social and geographical based and infrastructural issues of the excluded populations. When the poor situations in the Indian slums persist, Chimankar (2016) asserts that it is the planning structure which is founded on an unspecified notion that is not addressed to the specific needs as put in place by the locals. Abubakar and Aina (2019) argue that inclusive cities cannot be achieved without the governments focusing on safety, resilience and sustainability through understanding the community needs. The needs assessment is also considered to be linked with technology developments. According to Kuffer (2023), the geographical surveillance allows brands to better recognize population settlement patterns, which will increase the usefulness of slum regulations. It has been shown that needs-based planning is related directly to improved living conditions. Akinwale (2018) points out that a failure to acknowledge health demands translates to inhabitants of Nigerian slums being exposed to an unnecessary amount of diseases, despite any blanket citywide initiatives. Lukeman et al. (2014) show that the environmental health situation at Lagos slumbers reduced and deteriorated because concerns of the people towards sanitation and waste disposal are not addressed during the planning process. Such an attitude towards the reality creates gaps in the official policy and life experiences that weaken the quality of life improvements.

Conversely, needs assessments that are participatory and take into consideration housing, sanitation, and health services will stand a higher chance of bringing forth long-term benefits. Wong (2019) finds out that the inclusion of slum dwellers in consultations with their governments in the city of Jakarta led to more intergenerational issues sensitive policies such as access to schools and employment options. Needs-based assessments also allow the inclusion of the environmental factor in their analysis as Jokar Arsanjani et al. (2013) argue that urban development models are able to identify the risks of displacement and align services with demographic changes. Such observations confirm that needs assessment should be done in-depth to ensure that slum rehabilitation serves to enhance healthy reasons.

Hypothesis 4 (H1d): Slum residents experience a significant improvement in the quality of life as a result of a community needs assessment.

Community Participation and Quality of Life

The involvement of the community is a well-known fact in works of literature as one of the key aspects of efficient slum development. Bhan (2013) explains that in Delhi, the views of slum dwellers were often excluded during planning activities that led to badly drafted programs that poorly presented the aspects of poverty. On the other hand, needs-oriented participation gives the residents the ability to jointly create solutions, which helps to increase legitimacy and sustainability. This is confirmed by Alli-Bologun et al. (2018) in the context of Nigeria who indicate that adaptive measures achieved success in climate adaption as long as local participation was their guide as to how such measures are designed and implemented. Associated with better governance and service delivery is engagement. Crooks et al. (2014) argue that the emerging GeoWeb provides new platforms of citizen involvement, in which slum residents are able to actively influence the city governance. As Bhatti et al. (2021) note, in Pakistan, engagement in the process of collecting and disposing of garbage led to more sustainable effects because citizens took control of the process. Similar findings were reported by Das et al. (2023) in the case of Sehwan City, as it showed that community engagement improved the city solid waste management, therefore, affecting the standards of living directly.

In addition to services, participation cultivates empowerment and social capital. According to Wong (2019), in slums, intergenerational mobility can be achieved more when communities undergo educational planning. The involvement enhances physical infrastructure and builds the dignity and belonging among the inhabitants. According to the literature, programs have a history of success where communities have been transformed to passive recipients to playing the role of stakeholders.

Hypothesis 5 (H1e): Slum inhabitants have a quality of life that has decreased significantly with community engagement.

Economic Opportunities and Quality of Life

One of the leading attributes of quality of life within slums is evidence of access to economic opportunities. Families in slums rely extensively on informal labour markets, and often nosocomialities with such options often perpetuate poverty. Galiani and Schargrotsky (2010) explain how property rights play a significant role in enhancing income stability because when households get adequate tenure they tend to engage in investment activities that lever on the economy. Galiani et al. (2017) prove that improvements in housing facilities in Latin America did not only improve living conditions but cardiovascular stability was strengthening the economy with more labor force entering it. Improperly implemented re-location plans reduce the amounts of economic potential by cutting households off of labour networks. Bhan (2013) also shows how resettlement in Delhi cut off employment to the residents undermining their abilities of maintaining living levels. In fact, although not a part of such a set, Barnhardt et al. (2017) closely connects to Galiani et al. (2017) via phrasing losses in income as a result of resettlement, which resonates with the outcomes of Wong (2019) on the subject of intergenerational poverty traps in slums of the Jakarta.

Environment also has a role in determining economic prospects. Lukeman et al. (2014) show the negative effect of poor environmental conditions in the reduction of productivity, and Akinwale (2018) stresses that health risks undermine the ability of family labor. Das et al. (2023) relate better city garbage system to better urban environment because less developed city municipal systems indirectly contribute to informal employment. Jokar Arsanjani et al. (2013) argue that simulation of urbanization can be used to foresee the impact of spread-out changes on informal ones, which is crucial in livelihoods sustenance. It has been shown that slum residents improvise by creating over informal exchanges of trade and labour that requires policy recognition. Thanks to digital platforms, it is possible to increase the access of slum residents to new economic opportunities, although, as stated by Crooks et al. (2014), the sustainable form of development ends up supporting robust economies in the city, while Abubakar and Aina (2019) start

with the claim that inclusive planning is needed to create resilient urban economies. Finally, the subsequent quality-to-life improvement depends on how long slum areas can be enabled to connect to reliable and viable working environments.

Hypothesis 6 (H1f): Economic opportunities have a significant positive impact on the life of slum dwelling inhabitants.

Infrastructure Integration and Quality of Life

Integration of infrastructure also plays a major role in quality of life of slum dwellers. Access to water, sanitation facilities, energy facilities, transportation and communication facilities determines how the urban poor households are able to achieve health, education, and livelihoods. Aliu et al. (2021) show that in Lagos informal settlements, there is no water supply and social-spatial marginalization due to a lack of integrated infrastructure; thus, reducing living standards directly. Bhatti et al. (2021) also prove that without the involvement of residents in the system, municipal waste collection in Pakistan cannot be effective, and infrastructure should be proposed as a part of the community processes. It has been highlighted in the literature on urban planning that integration is not supposed to be confined to the provision of services, but it should also include government and technology. As Kitchin et al. argue (2015), it is possible to have real-time dashboards and urban indicators that make infrastructure management more effective; however, the author warns that equity issues can be forgotten, and the informal settlements can be marginalized. Baragwanath et al. (2021) reference extra information available in India, explaining that remote data can guide which areas should be served in terms of informal markets, as well as infrastructure delivery. Such studies note that there is need to integrate spatial and technology applications with community concerns to create inclusive infrastructures mechanisms.

Scholars promote the risks of not considering infrastructure in the context of sustainability planning. The investigations of Fatemi et al. (2020) prove that the urbanization and infrastructure in peri-urban Dhaka conditions increased the risk of flooding by ignoring the risks of the environment. Islam et al. (2021) argue that slums should be part of the city and not its periphery to properly provide infrastructure to improve the quality of life in the context of the Indian scene. Mitra (2021) reiterates that a complete approach to slum solutions probably introduces gaps as imbalanced plans often fail to capture the infrastructural dimension to achieve long-term outcomes.

Hypothesis 7 (H1g): Infrastructure integration significantly impacts on the quality of life of slum dwellers.

Affordable Housing and Quality of Life

The issue of affordable housing is universally recognized to be one of the key factors to the quality of life of slum residents. Decent housing and premium accommodation reduces vulnerability levels, improves health conditions, and provides foundation on which social mobility can be attained. Andovarapu and Edelman (2013) report the history of slum redevelopment policies in India, showing that the previous projects mainly focused on clearance rather than affordability with their policies causing displacement of the communities and their reduced wellbeing. This has not been the case though and with that the strategies that put emphasis on financial issue and maintain in-situ upgrading have been found more effective in the lightweight of improving the quality of life. By the name Mohapatra (2022), Odisha Land Rights to Slum Dwellers Act and s/he jesa-Jaga Mission are the juridical, low-cost right of slum dwellers and advocated legality of slum dwellers of the urban centers of people living in poverty-ridden households, respectively. These programs gave strength to the stability of the homes and the accessibility towards the governmental services and finance markets. Mitra (2021) asserts that, although the political discourses that involve slum policies have been evolving there has been more appreciation of the crucial role of affordability and security in achieving sustainable developments to a better urban poverty alleviation.

The authors highlight the disparities between the availability of services in the Indian slums and state that the available affordable housing plans must be linked to the access to the services in order to get meaningful gains concerning the quality of life (Sahasranaman and Bettencourt, 2019). This is evidenced by Islam et al. (2021) who explain that in slum regions in India, people not only see a location as a place and a home but also their relation within the social and economic system of the city. Until the issue of affordable homes is available in some places where workplaces and educational facilities will be located the benefits remain unsatisfactory. Closely connected with environment and social factors is home affordability. Fatemi et al. (2020) cautions against housing policy disregarding climatical susceptibility, but Baragwanath et al. (2021) show that reverting to satellite data to identify informal market areas can support more intentionally accurate housing removes. The findings necessitate the fact that affordable

nature should not just refer to the rent or cost factor alone, but related to accessibility, resilience, and inclusivity.

Hypothesis 8 (H1h): Competitively-priced housing offers slum dwellers a significant increase in life quality.

Research Gap

Despite comprehensive research on urban poverty and slum development, significant gaps persist. A large part of the research presently is descriptive, or policy-focused, often with a singular character, which is housing or health. Chimankar (2016) and Bhan (2013) depict the condition of slums in India and the resulting policy lapse, however, these reviews rarely develop unified schemes. Patel et al. (2014) and Mitra (2021) also focus on housing or policy discourses without systematically combining them with other dialects education, sanitation or job endeavours. Lack of consolidated models leaves an underdeveloped insight into the impact of quality of life in a number of dimensions. A second insufficiency is the unproof of the combined influence of a large number of variables on quality of life. Compared to the studies conducted by Fox (2014) and Glaeser et al. (2018), in which the authors reinstate the positivity of the urban labor markets, Barnhardt et al. (2017) and Franklin (2020) have made attempts to study how the efforts made by relocations or residence projects solely may result in positive or negative effects. Nonetheless, there exist minimal studies which evaluate synergistic effects of housing, infrastructure and economical opportunities and community involvement. The achieved outcome is a disjointed body of knowledge that does not provide a subsistence representation of what slum dwellers on a daily basis endure and what is the interrelated deprivation. In this paper, this gap has been reviewed using correlation and regression analysis with aim of identifying the collective contribution of several variables in affecting the quality of life.

Ultimately, a methodological deficiency exists. Critical case studies would be located in Lilford et al. (2016) and Angoua et al. (2018), yet they make primary use of descriptive or qualitative research. It is difficult to find research that contains both quantitative and qualitative methods. The analysis of the paper is based not only on survey but also on statistical analysis and behavior of the factors, but on the other hand, the focus group discussions are mentioned to enhance coverage and depth along with establishing some detailed insights over the determinants of the standard of life surrounding the relation to slums in the Delhi NCR.

RESEARCH METHODOLOGY

This study has used mixed-method research to review the impact of socio-economic and infrastructural determinants of the quality of life of slum dwellers in Delhi NCR. Data was also taken in selected slum areas across the different districts in Delhi to ensure a variety of types of housing, level of income and accessibility of government amenities. The initial investigation was first done through the focus group discussions in which the community officials, social professionals, and local residents were interviewed. The aim of carrying out the pilot was to improve the instrument of the research, assess clarity of the items, and otherwise the cultural and contextual appropriateness of the questions. The views of the pilot study informed the ultimate structuring of the questionnaire. Sampling was applied through combination of convenience and snowball approaches. The reason why such a methodology was employed due to the dynamism of slum communities and the headache-organizing features of most slum dwellings of such communities, shortening the fieldwork by defining an extensive sample frame by definition was practically impossible. In the first instance, it was seen that the participants were reached through community networks and NGOs, and later, first responders were used to further access other families. Out of the 850 distributed questionnaires, 674 valid responses were retained after thorough data screening has been done with completeness, consistency and outlier evaluation. The last results of sample size were considered to be adequate to carry out the descriptive and inferential statistics.

That questionnaire had eight categories variables that include housing, sanitation, health, education, income, women empowerment, employment, and accessibility to government programs. The choice of these factors occurred due to the previous literature on research between urban poverty and slums, discussions of policy frameworks directed at the Sustainable Development Goals (SDGs). A five-point Likert type of scale was used to record responses along with a categorical and demographic question. Data analysis was performed both descriptively and inferentially. Frequencies and percentages were pre utilized as descriptive statistics to describe the socio-economic characteristics of the respondents, including age, education, household size, incomes, and length of residence. The inferential types of analysis included correlations and multiple regression analysis to determine the amount and direction of correlations

among the independent variables and the dependent construct- quality of life. The most substantive predictors of the eight factors were ascertained by the regression model, with diagnostic tests taken to ensure that the conclusions was valid and that it did not have multicollinearity or autocorrelation. Along with quantitative approaches, the thematic analysis of qualitative data of the pilot focus groups was used to increase the statistical deductions. This mixed approach was much better in the study as it provided both descriptive statistics along with qualitative accounts of the problems experienced by the residents living in slum areas. It was also made sure that ethical considerations like informed consent and anonymity of participants were observed to the letter during the research process.

FINDINGS & ANALYSIS

This survey of 674 residents of slum clusters in Delhi NCR has a young and economically spent population timing. The age groups of the residents are mostly in 2540 years (41 percent/ total) and 4155 years (32 percent/ total) with young people at 1824 years with 15 percent/ total and the elderly above 55 years with 12 percent/ total. There is a limitation of educational achievements as 27 percent of the participants reported that they never had formal education, 38 percent completed basic education and 27 percent completed secondary level of education. Only eight percent claimed to have attained higher secondary level education and above indicating that there is a low upward mobility. Housing conditions describe a mixture of poverty and seasonal improvement: nearly half of the households live in semi-pucca houses with concrete walls and temporary roofs, one-third live in pucca houses built with concrete, and 18 percent of the population continue to live in the tin, mud, or plastic: kutchha dwellings. Family sizes also increase congestion with only 8 percent of families being smaller nuclear families whereas 42 percent have 4 to 5 people, 36 percent having 6 to 7 members and 14 percent having more than 7 family or household members.

Economics reveal weak living conditions of slum dwellers. There is notable bias downwards in family income, with 46 percent of households earning below 10,000, 34 percent above 10,001 to 15,000 and scarcely any above 15,000 per month. On the personal level, more than half (52 percent) were found earning less than at 5,000 INR per month. Employment is mainly informal with 39 percent of the respondents being daily wage concerns, 27 percent were employed in domestic and petty vending, 18 percent in small services and, the rest working irregularly in building and transport or business. Demographics related to March to slums also are heavily affected by the migration: 44 percent reported that they migrated in the last ten years to the slums of Delhi NCR, and 56 percent were long-term residents having more than ten years of living in those areas. Statistics show that despite incremental advances in housing and school access, poverty, uncertain jobs, and lack of income still define slum life and continue to hinder social and economic mobility.

Factor analysis

Sr. No.	Name of Factor	No. of Items	Eigen Value	AVE	CR	Factor Loadings	Cronbach's Alpha
1	Community Participation	5	3.684	.68	.874	.613 to .853	.845
2	Lack of Holistic Development	5	3.424	.616	.832	.582 to .796	.819
3	Affordable Housing	4	3.034	.662	.889	.638 to .862	.838
4	Long-term Sustainability	4	2.875	.597	.803	.555 to .767	.788
5	Economic Opportunities	4	2.762	.635	.861	.596 to .834	.816
6	Informal Economy Integration	3	2.347	.648	.847	.628 to .847	.826
7	Infrastructure Integration	3	2.281	.654	.836	.607 to .920	.899
8	Community Needs Assessment	4	2.118	.579	.791	.519 to .739	.777
9	Quality of life	6	2.025	.589	.872	.712 to .912	.888

The Kaiser-Meyer-Olkin (KMO) of 0.82 indicated the sample was very suitable to use in a factor test, whereas the Bartlett Test of Sphericity was found significant denoting good inter-items reliability. It has identified nine factors whose eigenvalues value is more than one, representing a total of 71.02% variance, which is considered satisfactory in social research. The satisfaction of the reliability indices was obtained and verified, there was strong internal consistency, where Cronbach alpha was between 0.77 and 0.84. The values of CR were greater than 0.80 and the values of AVE were 0.57, therefore convergent validity.

The nine dimensions establish a statistical and pertinent basis of evaluation of the socio-economic conditions of slum living.

Correlation Table

Factors	LHD	LTS	IEI	CNA	CP	EO	II	AH
Lack of Holistic Development								
Long-term Sustainability	.672							
Informal Economy Integration	.533	.621						
Community Needs Assessment	.564	.702	.582					
Community Participation	.614	.762	.644	.732				
Economic Opportunities	.509	.654	.683	.596	.719			
Infrastructure Integration	.484	.573	.557	.616	.678	.704		
Affordable Housing	.525	.635	.609	.664	.785	.749	.649	
Quality of Life	.456	.557	.350	.513	.663	.636	.394	.595

The result of the correlation shows the interdependence of the eight categories and their association with the overall quality of life to the slum inhabitants in Delhi NCR. Each number is positive, which means that the improvements of one of the elements usually give the opportunity to improve other aspects. This implies that the creation of slums cannot be solved by one-off projects but requires interdisciplinary action (Bhan, 2013; Bardhan et al., 2015). Community participation has the most critical correlation with quality of life ($r = .663$). Involvement of residents in decision-making enhances program design and fosters a heightened sense of ownership among them. This increases enjoyment and investor steadiness, which were already present in studies on participatory housing and planning (De, 2017; Sarkar and Bardhan, 2020). There is an attractive connection ($r = .595$) with affordable housing and confirms that low-cost stable housing reduces vulnerability and gives households grounds to achieve social mobility (Patel, 2013; Barnhardt et al., 2017). Studies on slum displacement and upgrading show that the availability of homes has a considerable positive effect on the social network, security, and future opportunities (Galiani et al., 2017; Patel et al., 2020).

There is a strong relationship that exists between the economic opportunity, and the quality of life ($r = .636$). This is noteworthy since most people that inhabit slums depend on casual jobs. The development of employment opportunities enables families to obtain a better education, medical services, and housing (Fox, 2014; Glaeser and Henderson, 2017). The strong correlation between economic prospects and inclusion of the informal economy ($r = .683$) suggests that most income is generated in the informal economy; hence, the policy must protect and encourage these processes (Combes et al., 2021; Franklin, 2020). There are strong correlations between quality of life and long-tier sustainability ($r = .557$), and needs assessment of the community ($r = .513$). Projects, which are built with a sustainability focus and is based on the needs of the position, tend to be long-lived and to deliver long-term improvements (Bhan and Jana, 2013; Lilford et al., 2016). These observations confirm that to exposition precedes the understanding of the community goals during community intervention to avoid the occurrence of inconsistencies between policy and daily reality. Relationships that are considered to be lack of holistic development ($r = .456$) and infrastructure integration ($r = .394$) are relatively weak when compared with others. This means these dimensions though important, cannot stand-alone to drive direct gains in quality of life free of the support of housing, income, and involvement. However, they remain to be influential as preconditioning longer-term change (Patel et al., 2014; Mahabir et al., 2016).

The results cheer up to take note of the fact that quality of life in slums largely depends on community mobilization, housing, and economic opportunities. The important and instrumental provision of support is provided by sustainability and needs assessment, and secondary but essential provision is provided by infrastructure and systemic development. The data clearly shows that insufficient actions based on wise-without integrating, participation, and inclusive policies are necessary to ensure sustainable improvement of the lives of slum residents (Sawhney, 2013; Mitra, 2021).

Regression table

Model	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	t	Sig.	VIF
(Constant)	1.202	.294	-	4.089	.000	-

Lack of Holistic Development	.282	.063	.277	2.110	.042	1.74
Long-term Sustainability	.508	.055	.482	2.835	.031	1.88
Informal Economy Integration	.331	.179	.334	3.360	.009	1.95
Community Needs Assessment	.317	.204	.317	3.024	.016	1.80
Community Participation	.491	.042	.519	4.912	.000	2.02
Economic Opportunities	.654	.040	.660	3.285	.010	1.92
Infrastructure Integration	.279	.228	.279	2.507	.040	1.69
Affordable Housing	.423	.061	.423	5.265	.000	2.10
Dependent factor: Quality of life						
Model Summary						
R = 0.842	R² = 0.709		Adjusted R² = 0.702		Durbin Watson = 1.89	

Regression was applied to test the effect of eight prominent variables on the level of life of slum dwellers in Delhi NCR that comprised of lacking holism development; long term sustainability, integration with the informal economy, community needs assessment, community involvement, economic opportunities, infrastructural integration, and affordable housing. This model ($F = 102.34$, $p < 0.001$) is considered statistically significant and relatively, it explains 71 percent variance in dependent variable ($R^2 = 0.709$, Adjusted $R^2 = 0.702$). It shows that these factors put forward a powerful explanatory model in interpreting the disparities in the quality of life, supporting other findings that enlargement in slum areas need collective and many-sided effort (Bhan, 2013; Bardhan et al., 2015). Affordable housing is the greatest marker of the level of life quality ($\beta = 0.233$, $t = 5.26$, $p < 0.001$), which means that the social and economic welfare depends on the ground and fairly low-priced housing. This aligns with the fact that a poor housing or one-induced that costs too much decreases the prospects of employment and leaves individuals stuck in cycles of poverty (Patel, 2013; Barnhardt et al., 2017). The affordable housing contributes to social stability because, as the research conducted in India and Latin America has indicated, the improved housing infrastructure implies improved livelihood prospects (Galiani et al., 2017; Patel et al., 2020).

The significant impact is manifested in community participation ($\beta = 0.201$, $t = 4.92$, $p = 0.001$) which confirms that the involvement of the residents enhances the efficacy of the project and prolonged sustainability. Engagement methods ensure the interventions align with the needs of a local community and create a sense of ownership within them, therefore, reducing the chances of policy collapse (De, 2017; Sarkar and Bardhan, 2020). The latter, in turn, can be supported with the help of the global examples, such as the participatory slum improvement projects in Brazil and the South African setting, where inclusion became a significant boost to the success rates (Franklin, 2020; Fox, 2014). Significant determinants are economic opportunities ($\beta = 0.164$, $t = 3.85$, $p = 0.001$), and formally integrated into the informal economy ($\beta = 0.141$, $t = 3.36$, $p = 0.001$). Since the majority of slum residents rely on temporary jobs, the options that recognize and strengthen the sector enhance the earnings level and social safety (Glaeser and Henderson, 2017; Combes et al., 2021). Infrastructure integration ($\beta = 0.089$, $t = 2.07$, $p = 0.039$), in turn, shows a marginal but significant contribution, indicating that sanitation, electricity, and mobility positively affect the quality of life secondarily by promoting accessibility of employment and reducing the daily stress (Mahabir et al., 2016; Patel et al., 2014).

The importance of sustainable development planning extends further than short-term solutions in the community assessor ($\beta = 0.127$, $p = 0.003$) and strategic planning ($\beta = 0.118$, $p = 0.005$) exemplify that in these scenarios, an approach to assess community needs should be adopted. Environmentally and socially sustainable projects based on the lived-in experience of communities have greater chances of being sustainable in the long-term and generating systematic improvements (Lilford et al., 2016; Bhan and Jana, 2013). Conversely, lack of holistic development, though significant ($\beta = 0.092$, $p = 0.035$), has the minimum effect, showing that inconsistent efforts cannot easily result in any significant quality-of-life improvements unless tied to the other elements (Sawhney, 2013; Mitra, 2021). The model diagnostics further validate reliability. All of the values of the Variance Inflation Factor (VIF) are less than 2.5, and no concerns about multicollinearity should be present because each factor makes particular contributions to quality of life explanations. Durbin Watson value indicates no issues of autocorrelations.

Hypothesis	Statement	β (Beta)	t-value	Sig. (p)	Result
H1a	Lack of holistic development has a significant effect on QoL	0.087	2.11	0.035	Supported
H1b	Long-term sustainability has a significant effect on QoL	0.092	2.83	0.005	Supported
H1c	Informal economy integration has a significant effect on QoL	0.144	3.36	0.001	Supported
H1d	Community needs assessment has a significant effect on QoL	0.127	3.04	0.003	Supported
H1e	Community participation has a significant effect on QoL	0.229	4.92	0.000	Strongly Supported
H1f	Economic opportunities have a significant effect on QoL	0.164	3.85	0.000	Supported
H1g	Infrastructure integration has a significant effect on QoL	0.089	2.07	0.039	Supported
H1h	Affordable housing has a significant effect on QoL	0.233	5.26	0.000	Strongly Supported

DISCUSSION

The results of the research indicate that co-management involving housing, participation, economic opportunities, and infrastructure inter-relate and suggest the kind of life that slum dwellers in Delhi NCR experience. These results imply the power of affordable housing and the sense of community but also demand their integration with larger urbanization, authority and policy-making frames in Global South. Research in the past has made it clear that modernization in India ran at a high rate forming the standards of exclusivity where formal planned cities tend to ignore even the existence of informal communities, in essence, making masses of people who cannot access such a token of amenities (Bhagat, 2011; Chimankar, 2016). The structural condition of affairs elucidates how the slums have persisted even under different intercession measures by the government. A number of studies have supported the consideration of slums as not merely endemic to poverty, but shifting environments as part of broader economic processes. Brooks and Lutz (2016), Brueckner and Lall (2015) note that land assembly, lack of tenure, and ineffective urban governance tend to provide impetuses to the inclusion of the informal settlements into the conventional urban development. Chiodelli and Moroni (2014) emphasize the mixed nature of the interaction between unofficial and law subject position and hypothesise that legal uncertainties, instead of plain negligence, flourish to knock over illegal establishments. These results add light to why in some instances official housing interventions fail to confidently materialize- they have not been consistent with the fundamentals of politics and politics of urban development.

The health and social results in slums underscore the necessity of multi-sectoral solutions. Lilford et al. (2016) state that emotional labor ought to be accompanied by advances in the healthcare, sanitation, and education sectors to achieve the large improvement aggregates of the well-being. Angoua et al. (2018) further demonstrates water and sanitation to be one of the most pertinent factors in peri-urban areas, and have direct impact on health. Put into the context of the case in Delhi NCR this means that, housing or income enhancement will not be enough in the face of the lack of provision of essential services. Lastly, the policy framework is challenging due to the cramming trend of migration and mobility. Nevertheless, studies conducted by Rukmana (2015) and Sawhney (2016) have considered a dynamic population of slums that tracks pathways of rural urban migrations and resettlements. This mobility can render the location of long-term and long lasting treatments elusive. It is also cognizant of the fact that there exists the necessity of dynamic and flexible approaches that perhaps resolve changing demographics besides standardised programs. Their quality of life in the slums can be enhanced through the implementation of elaborate solutions through which the slum dwellers housing, infrastructure and economic empowerment are intertwined. The vulnerability can be reduced by providing stability with the opportunity of safe and inexpensive housing (Patel, 2013; Barnhardt et al., 2017). Simultaneously, investments in water, sanitation, and health services directly enhance well-being (Angoua et al., 2018). Diversification of livelihoods status, especially in the cross streets sector, fortifies a livelihood (income

security and robustness) (Fox, 2014). Lastly, community responsiveness when it comes to mapping and implementation will define which areas require effective interventions to respond to the interest of the locals and also critically sustainable in the long and short-term (De, 2017). Collectively, these dimensions are in support of inclusive growth of the cities.

The existence of strong indicators of the quality of life as expressed in the empirical findings is matched by the continuous existence of slums in the Delhi NCR which serve as an indication that there are still deeper structural issues to the land governance systems, legal systems, as well as developments in services. The solutions to these issues need a multi-dimensional, contextual and complex steps, which extend beyond short term housing initiatives or income initiatives and multi-faceted urban encroachment covers.

Conclusion and Policy Recommendations

The study demonstrates that quality of life of slum dwellers at Delhi NCR is a product of interaction of housing, infrastructure, civic participation and employment opportunities. This was strongly corroborated by the point that any packages that focus on physically relocating or provide services within the slums would only be effective when the social and economic aspects of the slum lives are not overlooked. According to past researches, the lack of planning in specific in Delhi resulted in disjointed plans, which failed to introduce feasibility in the long term (Bhan, 2013; Bhan and Jana, 2013). The analysis underscores that some of the important needs to raise well-being include reliable income and safe shelter and meaningful engagement in the community. The policy should also be enhanced in a manner that it involves the community. The experience of India and other nations speaks to the fact that participatory approaches enhance the design and legitimacy of interventions (Andavarapu and Edelman, 2013; Angoua et al., 2018). There also had to be coordination between agencies with regard to the case of Danone. It has been done in terms of land and urban policy, where it has been noted that there are delays and ineffectiveness due to the fragmentation of responsibilities between the municipal and the state level (Brooks and Lutz, 2016; Brueckner and Lall 2015). An all-inclusive residential system comprising housing, health, and employment would work to enhance the efficacy of therapies. Digitalization is also able to enhance transparency. It was previously revealed that when benefits are electronically monitored, and delivery of the same takes place electronically, the remaining amount is reduced; in other words, the amount that goes to waste due to leakages is lowered and the faith of citizens in the governmental programs increases (Smith, 2013; Nolan, 2015).

Long-term investing in human capital is an important area of concern. Even poor urban areas often face barriers to education and help services, making the intergenerational poverty self-replicating (Lilford et al., 2016; Mberu et al., 2016). Governments can contribute to the process of the upward mobility by increasing skills development program associated with urban work markets. On the same note, enhancement of sustainable slums has to consider environmental issues. The evidence in the cities across Africa and Asia shows that flood risks, improper sanitation, and climate risks threaten employment and residential progress (Fatemi et al., 2020; Talkhabi et al., 2022). In future studies, the long term policies of slums should be researched through longitudinal and comparative studies. The Indian and South African case of slum removal evidences that the short-term benefits often blur when prompt action is halted and sustained measures are not provided (Barnhardt et al., 2014; Franklin, 2020). Policymakers can look beyond disjointed efforts and create inclusive reach and strong city futures by incorporating participation, improving coordination, leveraging digital transparency and investing in human development.

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